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TRANSMITTAL LETTER
(General - Patent Pending)

Docket No.
0435.092A

In Re Application Of: **LAWSON**

Serial No.
10/799,818

Filing Date
March 12, 2004

Examiner
Unassigned

Group Art Unit
3637

Title: **IMPROVED PALLET**

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Dated: **June 8, 2004**

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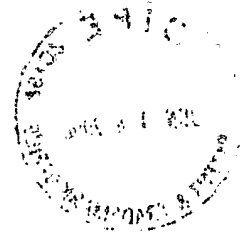
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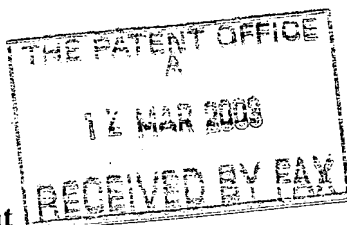
By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of:

PALLET DETECTION SYSTEMS LIMITED,
Airlink House,
53 Clark Street,
PAISLEY,
PA3 1QS,
United Kingdom

Incorporated in the United Kingdom,

[ADP No. 08821514001]

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Patents Act 1977
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Request for grant of a patent

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1. Your reference	32/64389GB		
2. Patent application number (The Patent Office will fill in this part)	0305660.3		
3. Full name, address and postcode of the or of each applicant (<u>underline all surnames</u>)	Iain Lawson 27 Ben Lui Drive Hawkhead Paisley PA2 2LT SECTION 90 (1, 3, 4 ACT) APPLICATION FILED 25/2/04 8583572001		
Patents ADP number (if you know it)			
If the applicant is a corporate body, give the country/state of its incorporation			
4. Title of the invention	Improved Pallet		
5. Name of your agent (if you have one)	Fitzpatricks		
"Address for Service" in the United Kingdom to which all correspondence should be sent (including the postcode)	4 West Regent Street Glasgow United Kingdom G2 1RS		
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Description 11

Claim(s)

Abstract

Drawings(s) 2 *only*

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Priority documents

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

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Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

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FITZPATRICKS
(Agents for the Applicant)

Date 12 March 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Eric Ede

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Improved palletField of the invention

The present invention relates to load-bearing pallets and provides improvements therein which enable the condition of a
5 load to be monitored.

Background of the invention

A pallet is a portable platform adapted for convenient handling by a fork-lift truck or crane or the like lifting machinery and is typically used for handling loads between a manufacturing
10 outlet and storage or distribution points. Thus, multiple pallets may be used to transport goods from a factory to a destination by a route that may involve a number of intermediate way points where the mode of transport may changed (truck, aircraft, ship, etc.) or the goods need to be off-
15 loaded for inspection or temporary storage e.g. in a warehouse. The pallet once loaded with the goods travels to the point of delivery of the goods where the goods are unloaded and the pallet is then available for re-use.

The needs of international commerce are such that pallets have
20 become standardised at least in so far as dimensions are concerned and reference may be made to the so-called "Euro-pallet" in this regard which has a deck area defined by a width of 80 cm and a length of about 120 cm.

Traditionally pallets have been made from wood, providing a
25 parallel-sided load deck that is assembled from closely spaced boards, short planks or spars of wood, or rails supported upon bearers that are typically thick wooden battens or "stringers", or riser blocks, which are spaced apart and usually aligned transversely with respect to the longitudinal axis of the
30 boards making up the load deck. In some pallet designs e.g. as in GB 2 291 037, the stringers are aligned diagonally under the load deck and corner blocks raise the deck and stringers sufficiently for access by lifting forks. In other pallet

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designs, especially wooden pallets, these stringers or blocks may be tied by further bracing cross-members that help retain the structural integrity of the pallet and also serve as ground-engaging skids or rests upon which the pallet stands.

- 5 In some cases the pallet may comprise opposed load decks so that it is fully invertible and thus useful "either way up".

- Wooden pallets have a limited period of utility due to susceptibility to mechanical damage due to rough handling thereof; deterioration due to rot arising from bacterial or
10 fungal attack, especially when exposed to damp conditions; contamination due to dirt or fluids penetrating the generally rough unfinished timber surface; and they may also become weakened or friable due to attack by termites, boring insects or mites. Environmental concerns about depletion of tree stock
15 as a natural resource have caused re-consideration about the use of wood for pallets.

- Furthermore, the need to find uses for recycling waste products have also contributed to synthetic materials e.g. reinforced or filled resin composites or recycled waste plastics, becoming
20 popular for the manufacture of pallets, e.g. as described in EP 1 207 178. Use of synthetic materials is also considered to offer advantages of longer useful life for the pallet produced therefrom, and improved hygiene and sanitary control by use of a material that is unattractive to rodents and insects, and is
25 also less susceptible to contamination by bacteria and moulds.

- A disadvantage of the use of virgin plastics is that the initial cost of the pallet is significantly elevated in comparison with that of a wooden pallet. Therefore, currently there remains a wide choice as to the material for pallet
30 manufacture, with wooden pallets still in widespread use.

Use of other materials such as metals is also restricted by weight and expense considerations, and susceptibility to

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corrosion. However, metals are used in pallet manufacture, e.g. as described in EP 0 006 366, and GB 1 393 278.

There have also been proposals to modify the basic pallet design by adding components to facilitate retention of loads, e.g. side panels may be added to convert the basic load platform into a box or packing case, e.g. as described in EP 1 264 774.

Therefore, the use of the word "pallet" hereinafter means products of the types described above without restriction as to materials used in its construction except where specified.

An object of the present invention is to provide improved pallets which offer additional technical advantages to users, specifically providing improved pallets that incorporate load-condition monitoring means. A further object of the invention is to provide a pallet that includes means for load-condition monitoring including a visible indicator means. A still further object of the invention is to provide a pallet having an integral device for monitoring a load condition. Yet another object of the invention is to provide a method of detecting potential deterioration in a load carried on a pallet without unpacking the load from the pallet.

Summary of the invention

According to first aspect of the invention there is provided a pallet adapted to retain a load-condition monitoring device, said pallet comprising at least a load-bearing deck and bearer members therefor, and having an accessible component located beneath the load-bearing deck and accessible from a side of the pallet, said component providing means for retention of a load-condition monitoring device.

The accessible component of the pallet conveniently may be one of the bearer members which is provided with a recess or compartment that is accessible from an exposed end-face or side

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of the bearer member. Alternatively, the accessible component may be an extra block or insert fixed beneath the load deck. Where the bearer member is a wooden stringer for example, the recess may be readily cut out from one of the end faces thereof to a size adapted for insertion of a load-condition monitoring device, and the latter may be retained in the recess by an interference fit. Where the bearer member is a synthetic material, such as a plastics or resin composite, a simple one-off adjustment to the current moulds would permit a moulding operation during pallet manufacture to provide the appropriate recess in an accessible side or face of the bearer. Optionally, for some applications of the device, the recess may be provided with a cover to provide a compartment within which a load-condition monitoring device may be located. The cover may be applied by an adhesive, or stapled or pinned in place, or provided with mechanical fixing parts such as rivets, teeth, or tags enabling the cover to be readily affixed over the recess e.g. by use of a light hammer.

A suitable load-condition monitoring device, ideally, would be adapted to push fit into an open recess, to be retained there by an interference-fit i.e. simple frictional engagement between the device external surfaces and the recess internal surfaces may suffice in many cases. However, in some cases use of a pressure-sensitive or peelable adhesive may be useful for assisting retention of the device in place, especially when the component of the pallet housing the device is of a synthetic material. A still further alternative is to utilise a releasable mechanical fixing such as a nail, pin or screw or the like fastener, or hook and fibre loop entanglement patches e.g. Velcro*.

It will be understood that the load-condition monitoring device becomes to all intents and purposes an integral part of the pallet in normal use thereof, and common sense dictates that care would be taken in designing the pallet to locate the

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device remote from surfaces liable to be contacted by the handling equipment, e.g. the lifting forks of a lift-loader.

The number of devices per pallet is not restricted, and the load-conditions that may be monitored are virtually unlimited, the only limitations being perhaps the expense of the device to be integrated into the pallet. Thus one may include a temperature sensor, which may be adapted to permanently record an extreme of temperature to which the load has been exposed. The ability to record the "highest temperature" is already commonly used in medical thermometers for example. Similarly, humidity and pressure conditions can be recorded using hygrometers and barometric devices.

It is preferred that the load-condition monitoring device is replaceable, but for some purposes the device may be an integral component that is built into the pallet during manufacture thereof and the device itself is adapted to release a replaceable part e.g. a removable cassette, or disposable detection medium such as a chemically treated substrate such as a reagent coated strip of paper or the like.

Thus according to another aspect of the invention there is provided a pallet comprising at least a load-bearing deck and bearer members therefor, and having an integral load-condition monitoring device located beneath the load-bearing deck and accessible from a side of the pallet for inspection purposes.

In a particularly advantageous application of the invention, an infestible commodities load carried upon a pallet can be monitored for contamination by pests such as insects or mites without needing to unpack the load and sample or otherwise directly inspect the goods packed upon the pallet.

Stored product arthropod pest management is a critical problem for many suppliers, distributors and retail outlets such as chain stores. Stored foods can be subject to significant

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infestation by the introduction of a single contaminated pallet-borne load. The nature of the pest, particularly its size, and typical nocturnal activity of many such pests is such that routine product quality controls in warehouses e.g.

- 5 product inspections upon receipt, or relying upon product warranties, product rotation within specified periods, regular visual ("walk-through") inspections, and finally customer complaints, tend to be unsatisfactory in eradicating the problem and there is an element of chance in such inspections
- 10 successfully detecting a contamination. Prevention is the preferred approach and whilst it is unrealistic to expect that to be completely achievable, the risks are remarkably reduced if the products could be screened better before being put into storage, ideally by providing for quality monitoring in
- 15 transit.

Therefore, according to a still further aspect of the invention there is provided a method of monitoring the quality of goods susceptible to arthropod attack, that includes providing a pallet comprising at least a load-bearing deck and bearer

20 members therefor, and having an integral arthropod trap located beneath the load-bearing deck and accessible from a side of the pallet for inspection purposes, loading the goods on the pallet, and periodically inspecting the trap for the presence of arthropods.

- 25 According to another aspect of the invention, there is provided a pallet comprising at least a load-bearing deck and bearer members therefor, and having an integral arthropod trap located beneath the load-bearing deck and accessible from a side of the pallet.
- 30 In this aspect of the invention, the pallet may also be of traditional wooden construction or of synthetic materials, or a combination of both. If a cover is to be used over a recess in the pallet that is to house the trap, then it must be provided

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with at least one aperture that is dimensioned to permit access to the trap by the target pest.

The trap may be any of the known type of pheromone/food attractant traps ("PFAT") and may be integrated into the pallet construction as a trap housing into which replaceable lure and trap components are inserted, ideally as a replaceable cassette, or the trap may be a discrete component that is attachable to the pallet by insertion into a suitable recess provided in the pallet, e.g. in one of the bearers.

- 10 The existing procedures and industry practices for recommended use of on-site placement of PFATs can be adopted for this new application in the modified pallet of the invention.

A possible embodiment of the trap would comprise a clear plastics cover, which permits ease of visual inspection, and apertures in its casing to permit access by the pests to the lure within the trap and a trap surface having an adhesive surface which retains the pest once it has penetrated the trap.

The trap may be a broad spectrum combined lure trap for general use, or it may be designed to target a specific pest or type of pest for goods that are targeted by a predicted species of pests. The trap may contain a corrugated cardboard insert supporting the lure and optionally include a plastic tray for the food attractant such as an oil. A replaceable glue coated insert may be used as the trap component for arthropod retention. In some cases a pitfall type trap may be adopted and incorporated in the pallet.

Pheromone lures are intended to target the adults and are considered to be highly effective, whilst food attractant lures are also effective for long-lived adults and some larvae. Food attractant lures include oat oil, wheat germ oil extracts and mineral oil. The advantage of food attractant lures is that they have relatively smaller effective range than pheromone

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lures and so it is more likely than not that when a pallet trap is found to be contaminated, the load on that pallet is also contaminated and should be removed from stock or goods in transit.

- 5 The aforesaid method of the invention can be usefully employed throughout the period between initial pallet loading and storage, goods in transit period, intermediate way-point storage, and storage at end-point destination. A key advantage of the method lies in the ability to pinpoint which particular
10 pallet may be carrying a contaminated load, permitting that pallet to be isolated before the infestation migrates to other adjacent loads. A further advantage lies in the ability to interrupt goods in transit to arrest contamination before a complete load is spoiled. This facilitates a reduction in risk
15 carried by the ultimate consignee and also offers benefits to the transport industry due to the greater likelihood of detecting a contaminated load as it is shifted from one way point to another or transferred between modes of transport.

- The opportunity to train personnel in the use of the trap
20 within a matter of less than a minute, to inspect and refresh or replace traps in the pallet is an additional advantage offered by the invention.

The invention will now be described more fully below by way of example with reference to the accompanying drawings in which,

- 25 Fig. 1 is perspective view from above of a typical pallet design, modified to include an integral load-monitoring device in a deck support block;

- Fig. 1a is an enlarged detail view of a modified deck bearer forming part of the pallet shown in Fig. 1 which shows
30 an arthropod trap recessed into the bearer; and

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Fig. 2 shows an arthropod trap that is suitable for incorporation in a modified pallet of the invention.

Modes for Carrying out the invention

The pallet shown in Figure 1, has an upper rectangular load
5 deck 1, supported upon bearers 2, the arrangement being that
the load deck is supported at each corner and also at a
position intermediate each side edge, leaving voids under the
load deck for access by lifting forks, as is conventional. The
pallet shown is invertible and has another load deck 11
10 attached to the bearers. One of the bearers is adapted to
accept a Pheromone and Food Attractant Trap ("PFAT") 3, by
insertion into a recess provided in the bearer. The PFAT is
integrated into the pallet by an interference fit into the
bearer. The PFAT is foraminated to provide various
15 apertures 4, which permit access into the PFAT and also air
circulation through the PFAT which permits release of pheromone
and food attractant odours to the air around the pallet.

The casing 5, of the PFAT in this embodiment is made of a tough
clear plastics material, of which there are many alternatives
20 available on the market, to facilitate inspection. The casing
houses a corrugated cardboard insert (not shown) that has been
doped with the pheromone lure and also houses an oil coated
member (not shown) which acts as a food attractant and is often
selected for its toxicity to arthropods, thereby providing a
25 dual-purpose role. The nature of such lures is familiar to
those in the art and needs no special explanation here. The
PFAT also includes a glue board (not shown) which has an
aggressively tacky surface that serves as the trap element from
which a pest such as an arthropod, once in contact therewith,
30 cannot free itself.

In a preferred embodiment, the necessary elements of the PFAT
are conveniently provided by attaching a combined bait and
pheromone tablet to the glue board, thereby providing a single

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element to be introduced to the casing of the PFAT. This arrangement permits rapid maintenance of the PFAT when a contaminated load is identified by removal of a contaminated glue board for pest evaluation by counting or other analysis and insertion of another glue board. The recovered pallet with refreshed PFAT is then ready for use again.

In normal use of the modified pallet with integral PFAT, as described, the pallet is loaded in the usual way and the PFAT is checked to ensure that it is free from trapped pests, and contains the appropriate lures and that they have not deteriorated. The loaded pallet can then be despatched or put into storage as required. At the next point of inspection, e.g. an intermediate way point in transit, where the load is transferred to another mode of transport or into a storage facility to await onward shipment, the PFAT is readily checked by simple visual inspection of the side of the pallet. Any pests in the products loaded on the pallet would have sensed the presence of the lure in the PFAT and left the products to investigate the lure. In the effort to reach the source of the pheromone or the food attractant bait, the pest would have entered the casing of the PFAT where it would have become entrapped upon the glue board. Visual inspection of the PFAT would reveal this. A pallet that appears to be contaminated can then be isolated, and the products in the load removed for analysis or destruction. Adjacent pallets in proximity to the contaminated pallet can be similarly checked out.

In alternative embodiments, the pallet may be of plastics construction and the PFAT may be replaced or supplemented by the presence of a device of monitoring another element of load condition such as temperature or humidity for example.

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Industrial Applicability

The modified pallet of this invention finds a use in the food distribution and hygiene industries and in the field of biomedical technology.

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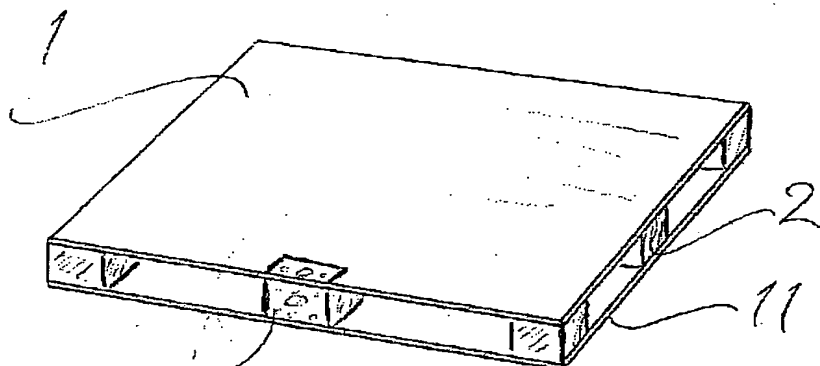


Fig. 1

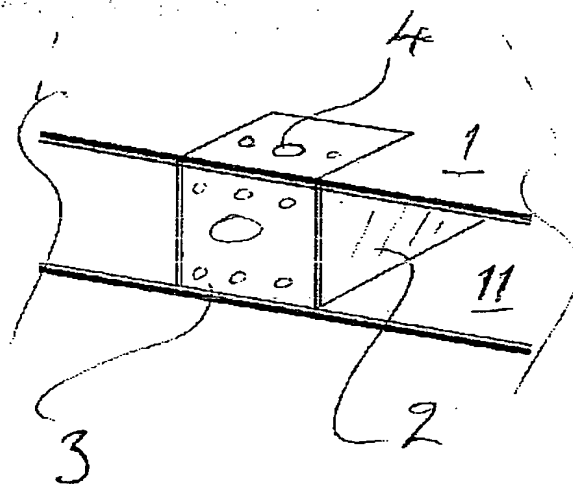


Fig. 1a

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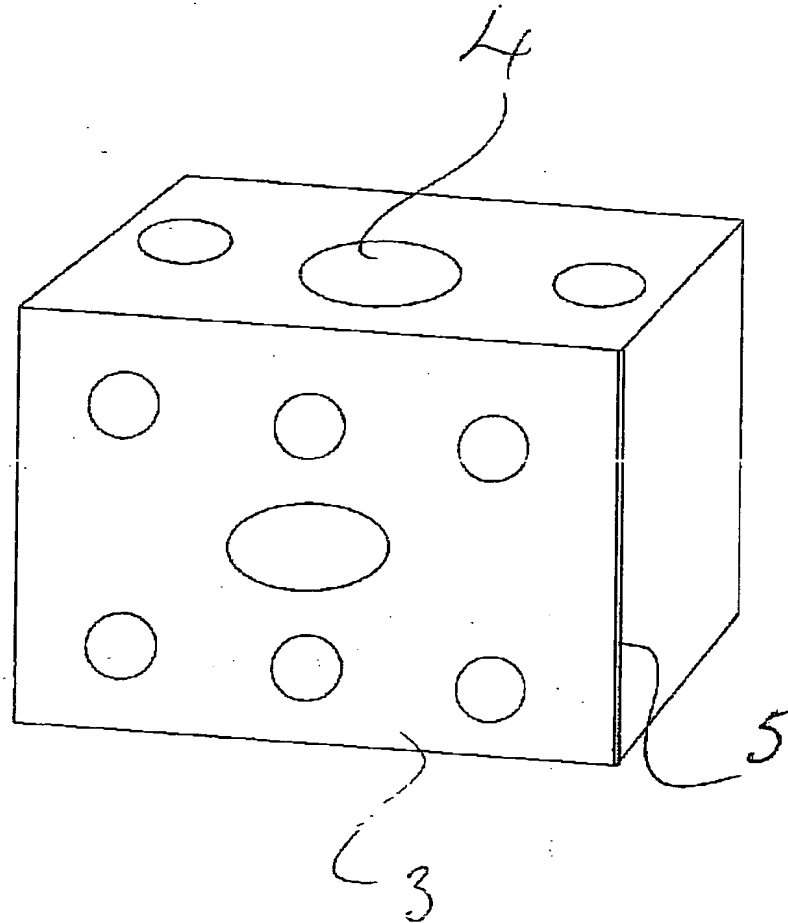


Fig. 2

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